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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,195	03/25/2004	Michael P. Galligan	4339/4358I (CON)	9678

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EXAMINER	
NGUYEN, NGOC YEN M	
ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
06/26/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/810,195	GALLIGAN ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-10,21,36-39 and 46-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-10,21,36-39 and 46-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 21, 2009 has been entered.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2-10, 20-21, 36-39, 46-50 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no sufficient support for “a catalyst member placed within a bend or curve within an exhaust manifold or exhaust flow pipe” as required in the instant claim 36. Applicants have pointed out support for this limitation at pages 18, 34, 35, 40, 41 and Figures 7A-C, however, on these pages, there is no mention of “a bend or curve”

nor placing the catalyst within a bend or curve. In Figure 7A-C, only the outer structure of the tubular catalyst member is shown, there is no disclosure that the catalyst member is actually positioned in a curve or bend of the tubular catalyst member.

For claim 9, support for "the carrier substrate comprises the interior surface of a conduit through which the exhaust of the internal combustion engine is flowed" can only be found on page 17, last 7 lines of the first full paragraph; however, the substrate is a "non-perforated tubular substrate", and there is no teaching in the instant specification that the "non-perforated tubular substrate" can be shaped by "bending and/or compressing" to conform to a bend or curve within an exhaust manifold or exhaust flow pipe.

Claims 7, 10 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

As disclosed in the instant specification, the carrier substrate can be a metal substrate or ceramic substrate (note first paragraph on page 6), and it is well known that the ceramic substrate cannot be bend or compressed to conform to a bend or curve within an exhaust manifold or exhaust flow pipe, the substrate as required in the independent claim 36 must be limited to just a metal substrate. Thus, claims 7 and 10 fail to further limit the independent claim 36.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-10, 20-21, 36-39, 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorynin et al (5,204,302) in view of Reck et al (6,485,694), optionally further in view of Ishida (4,455,281) and Rondeau (4,027,367).

Gorynin '302 invention relates to a multi-layered catalyst on a metal substrate for the catalytic conversion of gases, such as purification of exhaust gases of internal combustion engines (note column 1, lines 6-10).

Gorynin '302 discloses a catalyst comprising a metallic substrate; an adhesive sublayer diffusion bonded onto said substrate; and a catalytically active layer deposited on said sublayer and a porous layer deposited on said catalytically active layer (note claim 1). The adhesive sublayer is prepared from thermally reactive powders, such as those prepared from nickel and titanium, aluminum with at least one or more of Co, Cr, Mo, Ta, Nb, Ti or Ni or silicon with at least one or more of Ti, Nb, Cr, W, Co, Mo, Ni or Ta (note column 2, lines 25-35). For the composition of the Ni alloy used, it would have been obvious to one of ordinary skill in the art to optimize such composition to obtain the best adhesive layer.

Gorynin '302 further discloses that a catalyst of NiAl sublayer, gamma-alumina catalytically active layer and gamma alumina/manganese oxide porous layer was

assembled by corrugating a catalyst strip and rolling it into a cylinder (note Example, column 9, lines 64-67). The steps of "corrugating" and "rolling" as disclosed in Gorynin '303 are considered the same as "bending" as required in the instant claim 36 (note reason as stated in the 112, first paragraph rejection as stated above), and the cylinder as disclosed in Gorynin '302 is considered as having a "curve" because the cross section of the cylinder is a circle.

The adhesive layer in Gorynin is formed by plasma spraying. The thermally reactive powders are introduced into a plasma torch and an exothermic reaction is initiated in the torch. The exothermic powders impinge the substrate where the reaction continues. The heat generated in the reaction causes diffusion of the sub-layer into the substrate resulting in a diffusion bond and strong adhesion of the sublayer to the substrate (note column 3, lines 6-15). Thus, Gorynin '302 fairly teaches that the plasma spraying process is used to obtain a diffusion layer which improves the bonding between the two layers.

The process limitation in claim 36 is noted, i.e. "carrier substrate having an anchor layer *disposed thereon by electric sprayer*". However, when the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process of making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Optionally, Rondeau '367 discloses a method of thermal spraying a substrate to deposit a self-bonding coating on such substrate, comprising supplying an electric arc

thermal spray gun with a wire feed comprising an alloy of nickel and aluminum or titanium, and using such electric arc thermal spray gun, spraying said wire feed onto such substrate to coat the same thereby to establish diffusion bond between such coating and such substrate to provide a self-bonding coating on such substrate (note claim 1). Rondeau '367 discloses that several types of thermal spraying guns are available including combustion flame spray guns, e.g., the oxy-fuel gas type, plasma arc spray guns and electric arc spray guns. Combustion flame spray guns require a source of fuel, such as acetylene, and oxygen and the temperature produced therein are usually relatively low and often incapable of spraying materials having melting points exceeding 5,000°F. Plasma arc spray guns are usually the most expensive type and they produce much higher temperatures than the combustion type, e.g. up to approximately 30,000°F. Furthermore, plasma arc spray gun require a source of inert gas, such as argon, for creation of the plasma, and the gas flow rate and electric power therefor require extremely accurate control for proper operation. On the other hand an electric arc spray gun simply requires a source of electric power and a supply of compressed air or other gas, as is well known, to atomize and to propel the melted material in the arc to the substrate or target (note column 1, lines 25-43).

In undertaking the method of Rondeau '367 a number of important advantages are realized over the prior art. Firstly, the process uses an electric arc spray gun, which is more economically operated than other thermal spray equipment. Second, the material to be sprayed is supplied as a wire, which is more convenient to use than powder. The wire may be thin strand all the way up to a relatively thick rod as long as it

is suitable for spraying through an electric arc spray gun. Third, the wire is readily formed as an alloy of the two primary materials nickel and aluminum or nickel and titanium. Fourth, the cohesive, adhesive and hardness attributes of the coating on an article formed by the method of the invention are generally equivalent to or better than corresponding attributes for a coating on an article sprayed with powder using other thermal spray devices (note paragraph bridging columns 2-3).

Rondeau '367 can be further applied to teach that the wire alloy comprises a minimum of 93% nickel, from 4 to 5.2% aluminum, from 0.25 to 1.00% Ti (note column 4, lines 15-20).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use electric arc spraying method, instead of plasma spraying, to form the adhesive layer in Gorynin '302, as suggested by Rondeau '367 because electric arc spraying method can form the same diffusion bond between the two layers but it would cost less plus the additional advantages as stated above.

Optionally, Ishida '281 can be also applied to teach that it is known in the art to form an adhesive layer on a substrate of a catalyst by using electric arc spraying process before depositing the catalytic layer in order to form a catalyst that is highly resistant to peel off (i.e. better bonding) (note column 7, lines 62-67).

For claims 47-48, metal mesh, metal foam and metal honeycomb are analogous metal substrates for use in a catalyst for treating exhaust gas from an internal combustion engine. Without a showing of criticality or unexpected results, the use of a metal mesh or metal foam is not seen as a patentable difference because substituting

one substrate with an art-recognized analogous substrate to obtain a predictable result would have been obvious to one skilled in the art.

The difference is Gorynin '302 does not disclose the step of placing the catalyst in a bend or curve portion of the exhaust pipe.

Reck '694 discloses a catalytic A catalytic converter assembly for an exhaust gas system of an internal combustion engine, the catalytic converter assembly comprising:

a housing having a cross-section with a cross-sectional area;

a catalytic converter having at most two layers formed of sheets and disposed in said housing, said catalytic converter including: at least partially curved elongated body; and

at least one sheet of said sheets being a structured sheet having a structuring and a catalytically active material, said at least one structured sheet being wound on inclinedly around said at least partially curved elongated body and at least partially bears against said housing (note claim 1).

The catalytic converter is in relation to small engines, such lawnmowers, two-wheelers and similar uses (note column 2, lines 33-44).

Reck '694 discloses that the catalytic converter is flexible (note sentence bridging columns 4 and 5), has elasticity and plasticity (note column 5, lines 23-27). Reck '694 further discloses that one way of holding the catalytic converter in the silencer or muffler involves so squeezing at least a part of the catalytic converter in the silencer or muffler that the catalytic converter is immovable (note column 6, lines 14-17). As shown in Figure 4, the first, second and third catalytic converters 21, 22 and 23 are disposed in

the bend region 18. The first catalytic converter 21 is of a conical configuration (note column 8, lines 58-66). Based upon the teaching of “squeezing” at least a part of the catalytic converter, it would have been obvious to one skilled in the art to squeeze a portion of the catalytic converter in order to form a conical configuration as required for the first catalytic converter 21. By squeezing the catalytic converter, different substrate densities and different catalytic loading would be formed. Furthermore, as shown in Figures 1-4, 8, the corrugation crests and troughs in the catalytic converters are not uniform, especially at around the edges, thereby creating different substrate densities and different catalytic loading.

In Reck ‘694, since the catalytic converter can be put in the bend portion, it is considered as in “closed coupled position" or “adjacent the exhaust manifold” as required in the instant claims 49-50.

Claims 2, 6-11, 20-21, 36-39, 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reck ‘694 in view of either Ishida ‘281 or Gorynin ‘302 and optionally further Rondeau ‘367.

Reck ‘694 is applied as stated above to teach a catalyst convert assembly for an exhaust gas system of an internal combustion engine.

The difference is Reck ‘694 does not disclose an anchor layer.

Ishida ‘281 discloses a process for producing a catalyst unit for NO_x reduction of exhaust gas, wherein molten metal is sprayed upon surfaces of a metal plate allowing the molten metal to accumulate thereon to form rough surfaces and rough surfaces thus obtained are deposited with a catalytic substance for NO_x reduction of exhaust gas.

Forming the surfaces of the metal plate into rough surfaces is effected by molten metal spraying. In typical case, a metal wire is heated to be molten by contact resistance of electricity, an electric arc or high temperature flames, and molten metal thus obtained are sprayed together with gas such as compressed air through nozzles on the surfaces of the metal plate (note paragraph bridging columns 4-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an anchor layer deposited by electric arc method, as suggested by Ishida '281, in the catalyst used in Reck '694 because such anchor layer would prevent the catalytic substance from falling off, i.e. the anchor layer would promote bonding between the substrate and the catalytic substance.

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reck '694 in view of either Ishida '281, as applied to claims 2, 6-11, 36-39, 46-50 above, and further in view of Donomoto et al (4,798,770) or Draghi et al (6,042,879).

The difference not yet discussed is Ishida '281 does not disclose that the anchor layer comprises nickel and aluminum.

However, Ishida '281 teaches that the molten metal sprayed is preferred to be the same type of material as the metal plate (note column 5, lines 9-10) and the metal plate is desired to be heat resistant and corrosion resistant (note column 4, lines 53-64) such as stainless steel. It should be noted that the teaching of Ishida '281 should not be limited to just the exemplified metals.

Donomoto ‘770 discloses that alloys include Ni-Cr alloys, Ni-Al alloys containing 3-20% Al, Ni-Cr-Al alloys, Ni-Cr-Al-Y alloys are heat and corrosion resistant (note column 5, lines 51-63).

Alternatively, Draghi ‘879 teaches that MCrAlY, where M is nickel and/or cobalt, has corrosion and heat resistant properties (note column 4, lines 7-14). It would have been obvious to one skilled in the art to optimize the composition of the MCrAlY alloy to obtain the desired corrosion and heat resistant properties.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any known metal alloy which has heat and corrosion resistant properties, such as the MCrAlY alloys as suggested by Donomoto '770 or Draghi '879 for the metal carrier in Ishida '281 because such properties are desirable for the metal carrier.

Claims 2-10, 20-21, 36-39, 46-50 rejected under 35 U.S.C. 103(a) as being unpatentable over Reck ‘694 in view of Gorynin ‘367, optionally further in view of Rondeau ‘367.

Reck ‘694 is applied as stated above.

Reck ‘694 does not disclose the presence of an anchor layer.

Gorynin ‘302 is applied as stated above to teach an adhesive sublayer diffusion bonded onto the substrate to improve the bonding between the catalytic layer and the metal substrate. For the product by process limitation, note In re Fessmann and In re Brown as stated above.

Rondeau can be optionally applied as stated above to teach the use of electric arc spraying process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an anchor layer, i.e. the adhesive sublayer, in the catalytic converter of Reck '694 as suggested by Gorynin '302 because it would provide better bonding between the metal substrate and the catalytic layer.

Applicant's arguments filed May 21, 2009 have been fully considered but they are not persuasive.

The 112, first paragraph rejection for lack of support in the specification for the limitation "to conform to a bend or curve within an exhaust manifold or exhaust flow pipe" is withdrawn (note Advisory action mailed March 13, 2009) because it is disclosed in Applicants' specification that the carriers and/or catalyst members "can easily be molded to fit within a portion of an exhaust gas treatment apparatus that serves as a container for the catalyst member, ... or in another portion of the apparatus, e.g., an exhaust manifold, exhaust flow pipe, a high mass transfer area conduit, etc." (note page 18, lines 8-13, "to fit within" is considered the same as "to conform" and the "pipe" would inherently have a circular cross section and this cross section is considered as having "a bend or curve". However, if Applicants intend for the above limitation to have a different meaning, it may raise an issue of new matter. In the above new 112, 1st paragraph rejection, even though there is sufficient support for the required step of bending and/or compressing a catalyst member to conform to a bend or curve within an

exhaust manifold or exhaust flow pipe, there is no support for placing the catalyst member “within a bend or curve within an exhaust manifold or exhaust flow pipe”.

Applicants argue that Gorynin does not teach or suggest that the rolled catalytic cylinder is bendable to conform to a bend or curve within an exhaust flow pipe.

Since Gorynin ‘302 discloses that the catalyst is corrugated, which is the same as the disclosed "reshaped into a corrugated sheet" as disclosed in Applicants' specification (note page 18, line 4), it would inherently have the same "bendable" property as the claimed catalyst.

Applicants argue that Gorynin ‘302 does not teach the placing of the rolled cylinder in a bend or curve within an exhaust manifold.

New reference Reck ‘692 is now applied to teach the desire to place the catalytic converter, i.e. catalyst, in a bend or curve within an exhaust manifold.

The remaining arguments have been considered but are moot in view of the new ground(s) of rejection.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

nmn
June 24, 2009